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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/571,735	12/07/2006	Wilhelm Janssen	(46WD) 133334	6902

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General Electric Company
GE Global Patent Operation
2 Corporate Drive, Suite 648
Shelton, CT 06484

EXAMINER	
FINCH III, FRED E	

ART UNIT	PAPER NUMBER
2838	

NOTIFICATION DATE	DELIVERY MODE
01/28/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gpo.mail@ge.com
allyson.carnaroli@ge.com

Office Action Summary	Application No.	Applicant(s)	
	10/571,735	JANSSEN ET AL.	
	Examiner	Art Unit	
	Fred E. Finch III	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 8-11* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office action is in response to the amendment filed on 09 November 2009, as well as the supplemental amendment filed on 18 November 2009.

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spee et al. (U.S. Patent 5,798,631; hereinafter "Spee") in view of Mose et al. (U.S. Patent 4,876,637; hereinafter "Mose").

In re claim 1, Spee discloses a method for operating a frequency converter (Fig. 9) for a generator (BDFM) of a wind turbine supplying electrical power (P_T) to a public power grid (see right side of Fig. 9, "TO POWER GRID"), wherein the frequency converter comprises an AC/DC converter (28) connected to the generator, a DC/AC converter (38) connected to the grid, and a DC link circuit (Vdc, capacitor 32) for connecting the AC/DC converter to the DC/AC converter, the method comprising the step of: sensing a grid voltage of the grid to detect a grid condition wherein the grid voltage decreases by at least a predetermined threshold and remains below the predetermined threshold for at least a predetermined time (see Col. 16, lines 25-32; any controller which properly senses a grid voltage disturbance will have some predetermined threshold for altering the control of the converter). Spee also discloses maximizing the output current to the grid during such grid conditions (Col. 15, lines 53-

58). Spee discloses all of the limitations of claim 1 except for specifically reducing either a DC link voltage or an operation frequency of electronic switches of the DC/AC converter for increasing the output current of the DC/AC converter. Whereas Mose discloses an AC-DC-AC converter system (Fig. 2) and teach that it was known to control the inverter (4) to decrease the DC link voltage (Vdc) in order to increase the output current to the load (Col. 5, lines 62-64). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the invention of Spee by controlling the inverter to increase the DC link voltage during grid voltage disturbances in order to increase the output current of the converter, as taught by Mose.

In re claims 2 and 3, Spee and Mose disclose the claimed invention except for performing the reducing step when, for a few seconds, the grid voltage is decreased up to about 10% or 20% of its normal value, and wherein the reducing step is terminated when, for a few seconds, the grid voltage is increased to at least about 80% or 90% of its normal value. It would have been obvious to one having ordinary skill in the art at the time the invention was made to perform the reducing step and terminate the reducing step under the above-stated conditions, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller, 105 USPQ 233.*

In re claim 6, Spee discloses increasing the output current of the DC/AC converter (Col. 15, lines 56-58) without a substantial change in energy losses in the

electronic switches of the DC/AC converter (Col. 13, lines 33-39; output power from the converter can be maximized while minimizing electrical losses).

3. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spee et al. (U.S. Patent 5,798,631) and Mose et al. (U.S. Patent 4,876,637) as applied to claim 1 above, and further in view of Scott et al. (U.S. Patent 6,144,190; hereinafter "Scott").

In re claim 4, Spee and Mose disclose all of the claim limitations except for the step of reducing the output voltage of the DC link circuit comprising controlling the time interval between the zero crossover of the output voltage of a phase of the generator and an operation of an electronic switch of the AC/DC converter. Whereas Scott discloses an energy conversion system (Fig. 2) comprising an AC/DC rectifier (202) on the input side, an intermediate DC link circuit (236, 237, and 238), and a DC/AC inverter (214) on the output side, wherein the DC link voltage can be decreased by changing the firing angle of one or more of the gate drive signals (Col. 10, lines 24-27). The firing angle is defined at Col. 8, lines 47-49 as the timing between the gate signal and the zero-crossing of a phase of the generator output. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Spee and Mose by changing the timing between the zero-crossing of the generator output and the gate drive signals in order to decrease the DC link voltage as taught by Scott.

In re claim 5, Scott discloses a method of controlling a frequency converter (Fig. 2) wherein the step of reducing the output voltage of the DC link circuit (236,237, and 238) comprises reducing the pulse width interval of the electronic switch of the AC/DC converter (Col. 10, lines 24-26 describes reducing the pulse width of the rectifier gate signals in order to decrease the DC link rail voltage).

4. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spee et al. (U.S. Patent 5,798,631) in view of Widmayer et al. (U.S. Patent 5,483,127).

In re claim 8, Spee discloses a method for operating a frequency converter (Fig. 9) for a generator (BDFM) of a wind turbine supplying electrical power to a public power grid (see right side of Fig. 9, "TO POWER GRID"), in the event of a substantial grid voltage drop (Col. 16, lines 25-32), wherein the frequency converter comprises an AC/DC converter (28) connected to the generator, a DC/AC converter (38) connected to the grid, and a DC link circuit (Vdc, capacitor 32) for connecting the AC/DC converter to the DC/AC converter. Spee discloses all of the limitations of claim 8 except for reducing an operation frequency of electronic switches of the DC/AC converter for increasing the output current of the DC/AC converter. Whereas Widmayer discloses a power converter system (Fig. 1) comprising an AC/DC input rectifier (block on left), a DC link circuit (double arrow in center) and a variable frequency DC/AC output inverter (block on right labeled "Fluorescent Gas Discharge Lamp Control", shown in more detail in Fig. 5 as a DC/AC inverter), wherein the switching frequency of the DC/AC inverter can be decreased in order to increase the output current of the converter (Col. 13, lines 7-16).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the system of Spee and Mose by decreasing the switching frequency of the output inverter as taught by Widmayer, simultaneously with reducing the DC link voltage as taught by Mose, in order to increase the output current to the grid.

In re claims 9 and 10, Spee and Widmayer disclose the claimed invention except for performing the reducing step when, for a few seconds, the grid voltage is decreased up to about 10% or 20% of its normal value, and wherein the reducing step is terminated when, for a few seconds, the grid voltage is increased to at least about 80% or 90% of its normal value. It would have been obvious to one having ordinary skill in the art at the time the invention was made to perform the reducing step and terminate the reducing step under the above-stated conditions, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller, 105 USPQ 233.*

In re claim 11, Spee discloses increasing the output current of the DC/AC converter (Col. 15, lines 56-58) without a substantial change in energy losses in the electronic switches of the DC/AC converter (Col. 13, lines 33-39; output power from the converter can be maximized while minimizing electrical losses).

Allowable Subject Matter

5. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claim 7 recites reducing *simultaneously* both the DC link voltage and the operation frequency of the DC/AC converter switches for increasing the output current of the DC/AC converter. Mose teaches reducing the DC link voltage for this purpose, and Widmayer teaches reducing the switching frequency for this purpose. However, Mose also teaches (see Col. 6, lines 3-5) that by decreasing the link voltage to increase the output current, the switching frequency of the inverter is thereby *increased.* Therefore, it appears that the Mose reference teaches away from any hypothetical combination to perform these two steps simultaneously.

Response to Arguments

6. Applicant's arguments filed 09 November 2009 have been fully considered but they are not persuasive.

Applicant notes (Remarks, top of p. 7) that Figs. 1 and 2 of Mose refer to two different embodiments, and that the text cited by the Examiner did not match with the embodiment of the cited Fig. 1. Examiner has fixed this error in the above rejections, so that Fig. 2 is cited to match with the cited text. Examiner also notes that all of the

elements which were specifically pointed out in Fig. 1 (for instance the rectifier 2 and the inverter 4) also appear in Fig. 2 under the same reference numerals.

Applicant argues (Remarks, p. 7, 2nd paragraph) that Mose fails to disclose reducing the output voltage of the DC link circuit for increasing an output current of the DC/AC converter. However, Applicant has specifically pointed out directly above this that "reference generator 310 [of Mose] ... controls the frequency and phase of inverter 4 to decrease DC voltage Vdc, thus increasing input current Iac to AC motor 5." Therefore Examiner asserts that Mose does in fact teach the above limitation of reducing the output voltage of the DC link circuit (voltage Vdc) for increasing an output current of the DC/AC converter (current Iac).

Applicant further argues (Remarks, p. 7, last paragraph) that Mose teaches a different reason for increasing the output current than Spee. In particular, Applicant points out that Mose teaches increasing the output current after the AC *input* power has been dropped and then restored. However, the combination of Spee and Mose is not intended to encompass the particular reasons and conditions for increasing the output current that Mose teaches. Instead, it is intended to incorporate merely the *method* of increasing that output current from Mose into the system of Spee. Spee already points out the reason and conditions necessary for the increase: during a substantial grid voltage drop (see Col. 16, lines 25-32 of Spee). Applicant also argues (Remarks, p. 8, first full paragraph) that Mose and Spee fail to disclose "reducing, upon detection of the grid condition". Examiner asserts, as stated above, that Spee does teach that it is

desirable to increase the output current to the grid, via control of the inverter, during grid voltage conditions or disturbances (see Col. 15, lines 53-58 and Col. 16, lines 25-32).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred E. Finch III whose telephone number is (571) 270-7883. The examiner can normally be reached on Monday through Friday, 8:30AM - 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Monica Lewis can be reached on (571) 272-1838. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/F. E. F./
Examiner, Art Unit 2838

/Jeffrey L. Sterrett/
Primary Examiner, Art Unit 2838